

(presumably males) were heard in Missoula County (R. Escano and S. Reel, pers. comm.). We report the first confirmed nest record, previous evidence of nesting and additional sight records which include four winter records of Flammulated Owls in Montana.

On 15 July 1986 a Ponderosa pine (*Pinus ponderosa*) snag was cut for firewood near Blanchard Lookout, Blanchard Creek, Missoula County. A cavity in the snag contained three nestling Flammulated Owls. Two of the nestlings were partially feathered and approximately equal in size and age, while the third nestling was smaller and mostly in downy plumage. No information concerning habitat surrounding the nest area was noted.

Table 1 lists all known previous Flammulated Owl records for Montana. The Flammulated Owl is considered to be strictly insectivorous (Ross 1969; Winter 1974; Marshall 1967, 1978) and is generally believed to winter south of the United States. Four previous sight records (October, November, December, January) in Montana (Table 1) are of particular interest because of seasonal occurrence and as an indicator that vertebrate prey may be taken given the time of year. The fact that owls reported here were seen at midday during late fall/early winter and associated with a vole spp. and small passerines (Table 1), help to support the previous statement.

To our knowledge there are no published records of Flammulated Owls preying on vertebrates nor wintering in the northern Rocky Mountains. Likely, these small owls occur throughout western Montana in suitable habitat but have simply been overlooked because of their habits.

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LITERATURE CITED

- AMERICAN ORNITHOLOGISTS' UNION. 1983. Check-list of North American birds, 6th edition. American Ornithologists' Union (Washington DC).
- MARSHALL, J. T. 1967. Parallel variation in North and Middle American screech-owls. *West. Found. Vert. Zool. Monog.* 1:1-72.
- . 1978. Systematics of smaller Asian night birds based on voice. *Am. Ornithol. Union, Wash. D.C., Ornithol. Monog. No.* 25:1-58.
- ROSS, A. 1969. Ecological aspects of the food habits of insectivorous screech-owls. *Proc. West. Found. Vert. Zool.* 1:301-344.
- SKAAR, D., D. FLATH AND L. S. THOMPSON. 1985. Montana bird distribution. *Mont. Acad. Sci. Monog. No.* 3 44:1-70.
- WINTER, J. 1974. The distribution of the Flammulated Owl in California. *West. Birds* 5:25-44.
- WRIGHT, P. L. 1976. Further bird records from western Montana. *Condor* 78:418-420.

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NEST SITE COMPETITION BETWEEN OSPREYS AND CANADA GEESE AT LAKE ALMANOR, CALIFORNIA

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The Osprey (*Pandion haliaetus*) and the Canada Goose (*Branta canadensis*) nest in broken-top trees near water through much of northwestern North America. Canada Geese have been reported using Osprey nests (Yocum 1952; Geis 1956; Gabrielson and Lincoln 1959; Craighead and Stockstad 1961; Garber 1972) and artificial platforms constructed for Ospreys (Henny et al. 1978; W. D. Carrier, pers. comm.) in many areas.

Reports of interactions at nest sites between the two species are few. Fannin (1894) reported an unusual case in which both Ospreys and Canada Geese defended a nest containing eggs of both species. Flath (1972) observed conflicts at Osprey nest sites, including one case in which Ospreys apparently evicted geese that had begun nesting before Ospreys returned from migration. Another Osprey nest received double usage during a year with mild spring

weather, and geese fledged young prior to the Ospreys' return; Flath (1972) suggested that competition may be common during years with cool spring weather when delay in nesting by geese results in overlap in nesting seasons.

Yocum (1952) and Craighead and Stockstad (1961) suggested that at different times Ospreys may or may not successfully defend nests from Canada Geese but gave no supporting evidence. Garber (1972) reported use of an Osprey nest site by Canada Geese and subsequent use by Ospreys in two consecutive years at Eagle Lake, California. The Ospreys were unsuccessful, but whether nesting geese were disrupted was unknown.

Paucity of records presents difficulty in evaluating the importance and causes of nest site competition. Here, I report additional observations of interspecific interactions observed at nest sites at Lake Almanor, California. I also compare nest site characteristics for Ospreys and Canada Geese in the area and analyze the effect on Osprey reproduction of Osprey nest usurpation by geese.

Lake Almanor is a hydroelectric reservoir at 1450 m elevation in the northern Sierra Nevada, Plumas Co., California. Surrounding habitats are mixed-conifer and Jeffrey pine (*Pinus jeffreyi*) forests and mountain meadows (Verner and Boss 1980). Osprey nesting has been monitored since 1969 (Airola and Shubert 1981; Airola 1987). About 30 Osprey and 100 Canada Goose pairs nest annually at the lake.

I located and checked occupation of Osprey nests during annual ground searches of shoreline areas in April 1980–1984. Young were counted in nests from a helicopter in early July (within one to three wk of fledging). Only nests known to be occupied during early surveys were included in later calculations (see Postupalsky 1977). Effect on Osprey reproduction of Canada Goose occupation of Osprey nest sites was determined by comparing observed reproductive success with that expected if geese had not usurped nests. I located Canada Geese nesting at Osprey nests and other sites during early Osprey nest surveys. Other goose nests were found during incidental work and by confirming cooperator reports.

Extent of observations of interspecific interactions varied at nests. At one nest (#52), I made 37 short visits (340 min total) on 32 d while one or both species were present (4 April–27 May 1981). Other sites were visited only a few times during the nesting season. Nest heights were measured with a clinometer; mean heights (\pm SD) were compared using *t*-Tests (Zar 1974).

I observed an Osprey flying near nest 52 (which had been used in 1980 by Ospreys) on 4 April 1981. The nest was at the dead top of a 36 m live incense cedar (*Calocedrus decurrens*). Geese nested 200 m away in 1980 in a snag which had fallen during the subsequent winter. I checked the Osprey nest and found a Canada Goose apparently incubating on 5 April.

At 0800 H on 6 April, nest 52 was occupied by a pair of geese and two Ospreys were perched in a tree 50 m

away. The Ospreys began diving on the geese, who stood and defended the nest. The Ospreys made about 15 dives, but did not strike either goose which remained on the nest. At 1700 H I found both geese sitting on the nest (one presumably on eggs) and one Osprey perched in the tree used that morning. The Osprey again dove repeatedly at the geese; no contact was made and the geese defended the site. During brief morning visits the next three d (18 min total observation) both geese were on the nest site and one Osprey was at the same perch, but no harassment occurred.

On 11 April an Osprey began building a nest on a nearby snag not previously used. I observed no further harassment during 13 d (105 min total observation time) from 11–30 April when the goslings apparently fledged successfully. An Osprey worked sporadically on the new nest throughout this period (seen on eight of 13 visits) but was unsuccessful because the tree top was small and broken diagonally and would not support a nest.

On the day of gosling fledging, an Osprey perched 30 m from the nest in the main perch tree used by the pair during previous years. Ospreys were not observed using the perch while geese occupied the nest. Between 30 April and 8 May, an Osprey was irregularly present at the nest and perch tree (on six of 12 visits, 100 min). On numerous subsequent visits from 16 May–22 June no Ospreys were seen. On 4 August a new Osprey nest with two adults and no young was found further from the lake in the vicinity of the contested site and may have been a "frustration nest" (Postupalsky 1977) constructed by the displaced pair.

In 1982 the geese again occupied and fledged young from the same nest, but no Ospreys were observed in the immediate area (18 visits on 13 d during the early nesting season). Ospreys reoccupied the presumed frustration nest early and eventually fledged three young. The usurped nest tree toppled in winter 1982–83.

Canada Goose occupation at another Osprey territory apparently caused reproductive failure. On 15 April 1980 a goose incubated at an artificial nest-platform used by Ospreys during at least two of the three previous years (A. Camerena, pers. comm.). The Ospreys were apparently prevented from using the nest by the geese and constructed a nest at least two wk later than usual in a tree that provided poor nest support. Reproduction was unsuccessful, producing only one egg which failed to hatch. Nest failure may have resulted from the delay in nesting or disturbance by a nearby construction project. Geese did not occupy the platform nest in 1981 and Ospreys transported sticks from their previous year's nest to the original site. Successful nesting occurred at the site the next three yr.

Geese nested at one other Osprey nest site during 1980–84. In 1982 a goose pair used an alternate nest 150 m from an occupied Osprey nest (K. S. Kahre, pers. comm.). Ospreys had frequently used the alternate site as a perch during the eight yr use of the nearby nest. Aggression occurred between the geese and Ospreys during nest ini-

tiation in 1982. Ospreys frequently harassed the geese and once struck a goose in midair. Both species fledged three young. The alternate Osprey nest collapsed in winter 1982–83. The site was not reused by geese, while Ospreys nested successfully at their nest site in 1983 and 1984.

Three other instances of geese nesting at Osprey sites were recorded in the area from 1975–78 prior to my study (A. Camerena and G. Davis, pers. comm.). However, monitoring was insufficient to determine if Osprey reproduction was affected.

Overall, during five yr of intensive study three Osprey nests were occupied by geese (one occupied two yr) but only two of 132 Osprey nesting attempts were disrupted. Osprey reproductive success averaged 1.54 young fledged/occupied nest (see Airola and Shubert 1981; Airola 1987).

Mean (\pm SD) Osprey nest height at Lake Almanor was 38 (\pm 7.7) m ($N = 67$). Mean height of Osprey nests used by Canada Geese (including pre-1980 sites) was 42 (\pm 7.3) m ($N = 5$) and did not differ significantly in height from the mean for all Osprey nests ($t = 1.12$, $df = 65$; $P > 0.10$). Mean height of five non-Osprey tree nests used by Canada Geese at Lake Almanor was 20 (\pm 7.9) m, significantly less than the means for all Osprey nests ($t = 6.57$, $df = 70$; $P < 0.001$) and for those used by geese ($t = 4.57$, $df = 8$; $P < 0.01$).

My observations show that Canada Geese can appropriate and successfully defend a nest site from Ospreys, causing Osprey reproductive failure. Results support Flath's (1972) conclusion that conflicts are most likely to occur during years with cold spring weather. Canada Geese may begin nesting at Lake Almanor in early March (two to three wk before Ospreys arrive from migration) unless nesting is delayed or disrupted by weather. Flath (1972) reported observations in which Ospreys were dominant over geese, including eviction of geese from Osprey nests. In contrast geese that nested early in Osprey nests at Lake Almanor successfully defended nests from Ospreys. If adverse weather prevents early goose nesting, Ospreys are apparently able to reclaim and maintain their nests sites. I did not observe geese displace Ospreys from nests once Ospreys had established occupation.

Geese may prefer shorter trees for nesting; non-Osprey sites used by geese at Lake Almanor were substantially lower than Osprey nests. Similarly, seven goose nests found in 1954 by E. G. Hunt (pers. comm.) at nearby Mountain Meadows Reservoir, Lassen County were in 6–12 m snags. Such preference would not be surprising because the precocial goslings must drop to the ground soon after hatching (Craighead and Stockstad 1958, 1961; Hornocker 1969). Geese hatched from taller trees may suffer greater mortality from falls. However, data are lacking on availability of nest sites of various heights and goose use of shorter natural sites could reflect site availability. Nest area fidelity may prompt geese that lose nest trees to use nearby tall Osprey nests; at least once, geese used an Osprey nest following loss of a nearby, shorter nest tree.

Several factors may influence nest site selection by Ospreys. Ospreys at Lake Almanor appear to select tall sites that provide easy flight access and a view of foraging areas (Airola and Shubert 1981). Use of taller nest sites may also reduce predation by mammals on altricial young. Avoidance of interspecific competition for nest sites may also influence nest height selection by both species.

Effects of nest site competition on reproduction by both species appear to be minimal. Canada Goose occupation of Osprey nests over the five yr study reduced Osprey production by 1.3% and the Osprey populations increased (Airola 1987). Geese disrupt Osprey reproduction too seldom to substantially affect the Osprey population at Lake Almanor. No nesting geese were observed displaced by Ospreys; my Osprey nest checks, however, began in April and I could have missed some early Osprey evictions of geese. Earlier checks would be needed to fully assess effects on geese of nest site competition.

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LITERATURE CITED

- AIROLA, D. A. AND N. SHUBERT. 1981. Reproductive success, nest site selection, and management of Ospreys at Lake Almanor, California, 1969–1980. *Cal-Neva Wildl. Trans.* 1981:79–85.
- AIROLA, D. A. 1987. Current status of the Osprey on National Forests of California. Proc. Osprey Sympos., 1984 and 1985. Int. Osprey Found., Sanibel, FL.
- CRAIGHEAD, J. J. AND D. S. STOCKSTAD. 1958. Goslings descend from aerial nest. *J. Wildl. Manage.* 22:206–207.
- AND ———. 1961. Evaluating the use of aerial nesting platforms by Canada Geese. *J. Wildl. Manage.* 25:363–372.
- FANNIN, J. 1894. The Canada Goose and Osprey laying in the same nest. *Auk* 11:322.
- FLATH, D. L. 1972. Canada Goose-Osprey interactions. *Auk* 89:446–447.
- GABRIELSON, I. N. AND F. C. LINCOLN. 1959. *Birds of Alaska*. Stackpole Co., Harrisburg, PA.
- GARBER, D. P. 1972. Osprey nesting ecology in Lassen and Plumas Counties, California. M.S. Thesis. Calif. St. Univ. Humboldt, Arcata.
- GEIS, M. B. 1956. Productivity of Canada Geese in the Flathead Valley, Montana. *J. Wildl. Manage.* 20:409–419.
- HENNY, C. J., J. A. COLLINS AND W. J. DEIBERT. 1978. Osprey distribution, reproduction, and status in west-

- ern North America: II. The Oregon population. *Murrelet* 59:14-25.
- HORNOCKER, M. G. 1969. Goslings descend from aerial nest, attacked by Bald Eagle. *Auk* 86:764-765.
- POSTUPALSKY, S. 1977. A critical review of problems in calculating Osprey reproductive success. Pages 1-12. In J. C. Ogden, ED. Trans. N. Amer. Osprey Res. Conf. USDA Nat. Park Serv., Ser. No. 2.
- VERNER, J. AND A. S. BOSS. 1980. California wildlife and their habitats: western Sierra Nevada. USDA Forest Service Gen. Tech. Rep. PSW-37. Pacific SW Forest and Range Exp. Sta. Berkeley, CA. 439 pp.
- YOCUM, C. F. 1952. Techniques used to increase nesting of Canada Geese. *J. Wildl. Manage.* 16:425-428.
- ZAR, J. H. 1974. Biostatistical Analysis. Prentice Hall. Englewood Cliffs, NJ. 620 pp.
- Jones and Stokes Associates, Inc., 1725 23rd St., Sacramento, CA 95816.**

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AMERICAN SWALLOW-TAILED KITE USES MISSISSIPPI KITE NEST

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On 28 May 1985 I found an American Swallow-tailed Kite (*Elanoides forficatus*) nest at the Webb Wildlife Center, Hampton County, South Carolina. The nest was in a 36 m high, 52 cm dbh loblolly pine tree (*Pinus taeda*) located within a five ha thinned (basal area = 11.5 m²/ha) pine stand surrounded by a laurel oak (*Quercus laurifolia*)-switch cane (*Arundinaria gigantea*) forest interspersed with overcup oak (*Q. lyrata*)-swamp tupelo (*Nyssa sylvatica* var. *biflora*) sloughs. The nest was 390 m north of the Savannah River floodplain and 1.3 km north of the river itself. An active Mississippi Kite (*Ictinia mississippiensis*) nest was found within the same stand and near the top of a similar-size loblolly pine 72 m northeast of the Swallow-tailed Kite nest. The Swallow-tail pair fledged one young about 15 July while the Mississippi Kite pair fledged one young during the last week of July.

On 26 May 1986 I returned to the area and found a pair of Swallow-tailed Kites (presumably the same as last year) nesting on top of the previous year's Mississippi Kite nest. New nest material, primarily Spanish moss (*Tillandsia usneoides*) and some twigs, had been added to the top of the old nest.

I have found or observed 28 Swallow-tailed Kite nests in South Carolina between 1980-1986 of which six cases represent probably the same bird(s) reusing the same area in two consecutive years. Average distance between consecutive-year nests is 175 m (range 72-275 m). In no case has a Swallow-tailed Kite been found reusing the same nest. New Swallow-tail nests do not appear very substantial although some nests appear bulkier than others (pers.

obs.). Nest deterioration is obvious during winter months, but the basic foundation is usually intact the following spring when kites arrive from their wintering grounds. Although Bent (Life Histories of North American Birds of Prey, Part I. Dover Reprint, New York, 1961) reported that Swallow-tailed Kites do build on an old nest, I have found nothing in the literature to support this claim. Snyder (Breeding biology of Swallow-tailed Kites in Florida, *Living Bird* 13:73-97, 1974) found no evidence of nest reuse by Swallow-tailed Kites in southern Florida, but one nest was built in the same tree fork as a previous year's nest.

In coastal South Carolina Swallow-tailed Kites and Mississippi Kites usually occupy similar habitat (riparian woodland and mixed pine-swamp forests) and often co-occur in mixed feeding flocks (pers. obs.). However, Swallow-tails arrive on South Carolina breeding grounds in late March, about three to four wks earlier than Mississippi Kites. Both species place their nests near the top of tall trees (usually loblolly pine); Swallow-tailed Kites observed to date (N = 28) liberally use Spanish moss in nest construction while Mississippi Kites use only twigs (N = 8).

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